Micro- and nanoplastic ingestion in blue mussel larvae

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TH011 Micro- and nanoplastic ingestion in blue mussel larvae S. Rist, DTU (Technical University of Denmark) / Department of Environmental Engineering; A. Baun, Technical University of Denmark / DTU Environment; N.B. Hartmann, Technical University of Denmark (DTU) / DTU Environment. A large number of aquatic species have been found to ingest microplastics in the field and in laboratory studies. Benthic invertebrates seem to be especially exposed to this form of pollution and the blue mussel *Mytilus edulis* is one of the species that has been investigated most in this respect. Studies have not only shown that the mussels ingest microplastics but have also reported diverse adverse effects on a cellular to a physiological level. However, the work has so far only focused on adult mussels and it is unclear how blue mussel larvae interact with and are affected by plastic particles in the micrometre and nanometre size range. Therefore, this research aimed at studying microplastic ingestion and potential physiological effects in blue mussel larvae. The first experiment aimed at quantifying the amount of ingested and egested particles. Ten day old larvae were exposed to two different sizes of fluorescent polystyrene microbeads (2 µm and 100 nm) and body burdens of particles were quantified after 4h. Subsequently, larvae were transferred to clean water to analyse the amount of egested particles after 24h and 72h. The second experiment investigated potential effects of plastic particles on growth and development of the larvae. They were exposed to 3 different concentrations of the 2 µm and 100 nm beads, representing low (0.45 µg/L), medium (28.7 µg/L) and high (287 µg/L) exposure levels, for 2 weeks. Every 2-3 days larvae from the different treatments were sampled, fixed and photographed to analyse larval size and morphology. Results showed that the larvae readily ingested both particle sizes although ingestion appeared to be more efficient for the 2 µm beads. Egestion of micro- and nanoplastic particles did take place but was not complete within 72h, with 43% of the 2 µm and 61% of the 100 nm particles remaining in the animals. Potential effects on larval growth and development remain to be analysed. By taking other life stages into account and using a quantitative approach for analysing particle ingestion and egestion, this study contributes to enhancing the mechanistic understanding of microplastic – blue mussel interaction.